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ABSTRACT

This monograph reviews the research findings related to the oral questioning behaviors and practices of teachers. It also gives some attention to written and student-generated questions. The purpose is to provide teachers with knowledge to assist them in making decisions about improving classroom instruction. The monograph examines past and current research related to teachers' questioning practices and the impact of those questioning practices on student thinking, achievement, and attitudes. It reviews research related to questioning techniques and strategies and approaches to analyzing classroom questions. It examines the role of questioning within the broader context of classroom interaction, with a particular focus on recitation and discussion. Finally it presents an approach teachers can use to gather information on their own classroom questioning behaviors. Two analysis forms, "Question Levels" and "Questioning Techniques" are provided for the purpose. A bibliography containing 138 references is included. (IAH)

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What Research Says to the Teacher

THIRD EDITION

Questioning Skills, for Teachers

by William W. Wilen

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Questioning Skills, for Teachers

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by William W. Wilen

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INTRODUCTION

> To question well is to teach well. In the skillful use of the question more than anything else lies the fine art of teaching; for in it we have the guide to clear and vivid ideas, the quick spur to imagination, the stimulus to thought, the incentive to action. (26, p. 179)*

Although written at the turn of the century, the message conveyed by this quotation is widely embraced today by those who appreciate the role of teachers' questioning practices. Historically, the research and general teacher education literature have supported the positive influence of teachers' questions and questioning skills on student participation, thinking, and learning. Today, though, a growing awareness of the impact of teachers' use of questions appears to be developing, and investigations are focusing on a greater range of variables. Rather than continuing to study questions and questioning as isolated behaviors or techniques, researchers are beginning to examine them within the broader context of classroom interaction. In addition to wanting to know how many and what kind of questions and questioning techniques are being employed, contemporary researchers want to know, for example, more about the pattern of interaction being developed, the distribution of power and authority between teacher and students, and the content being studied. Because the use of questioning is pervasive in classroom instruction, it is important that teachers develop a studied interest in their own use of questions and questioning. Their witting and judicious use of these techniques will significantly increase the probability of achieving their instructional goals.

This publication reviews the research findings related to the oral questioning behaviors and practices of teachers. It also gives some attention to written and student-generated questions. The purpose is to provide teachers with knowledge to assist them in making decisions about improving classroom instruction. The monograph examines past and current research related to teachers' questioning practices and their impact on student thinking, achievement, and attitudes. It reviews research related to questioning techniques and strategies, and approaches to analyze classroom questions. And it examines the role of questioning within the broader context of classroom interaction, with a particular focus on recitation and discussion. Finally, it presents an approach teachers can use to gather information on their own classroom questioning behaviors.

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*Numbers in parentheses appearing in the text refer to the Bibliography beginning on page 34.

DEVELOPMENT OF INTEREST IN QUESTIONING

A Definition

Since the turn of the century little disagreement has existed concerning the definition of questions or the variety of functions questions can serve in the classroom. Questions are generally concerned with information-seeking and stimulate some kind of mental activity or thinking (68).

A question is broadly defined as any sentence having either an interrogative form or function (96). Questions are instructional cues or "stimuli that convey the content elements to be learned and directions for what they [students] are to do and how they are to do it" (85, p. 26). Two examples are "What is your opinion of the emphasis of the current economic policy?" and "Name the stages of photosynthesis." Both examples serve as instructional cues because they communicate content (current economic policy and photosynthesis) and direction (forming an opinion and recall) in both interrogative ("What is ...?") and declarative ("Name the ...") forms. Viewing questions as cues seems to support the old Palestinian proverb: "Understanding a question constitutes two-thirds of the answer."

Hunkins views questions as complex linguistic devices possessing several dimensions:

> function level—specific cognitive or affective levels;
> dynamic level—openness or closedness of the question;
> difficulty level—complexity and challenge to the student;
> interest level—intentness, concern and curiosity stimulated;
> feasibility level—student's ability to process the question (68)

Historical Background

For approximately the first 50 years of this century, the research on questioning was meager in quantity but significant in that findings provided a fairly consistent description of teachers' questioning behaviors (4, 13, 15, 16, 17, 19, 22, 46, 111). Stevens, who conducted the first major systematic research on questioning at the turn of the century, found that approximately 80 percent of the average school day was occupied with teacher questions and student answers. She recorded a mean of 395 questions per day during recitations primarily conducted during high school academic classes. Teachers verbalized about 64 percent of the time and asked two to four questions per minute. Students were expected to recall facts, but not necessarily to engage in thinking above the memory level. Stevens concluded that if instruction was to improve, teachers must develop questions that stimulate reflective thinking (111).

Beginning with Stevens's study, describing teachers' questioning behaviors became an area of research. For the most part, researchers' findings supported the discovery of low-cognitive-level questions over the next 40 years. Davis and others reported that three developments during the 1950s and 1960s stimulated renewed interest and further research in this area. First, increased attention toward intellectual achievements developed following the successful Soviet launch of Sputnik in 1957. Fearing that our academic programs were inferior to those of other countries, the federal government supported the development of a wide range of curriculum projects. The instructional strategies required to teach the new curricula emphasized the development of students' higher thought processes. These strategies, such as the inquiry approach, relied heavily on the teacher's ability to stimulate critical thinking skills through effective questioning behaviors (24).

Second, in order to study teaching directly and objectively, researchers began gathering data using systematic observation techniques. This approach provided descriptive and analytical information related to teacher and student behaviors as they were manifested in the classroom setting. Well-known systematic observation instruments are Flanders' Interaction Analysis and Amidon and Hunter's Verbal Interaction Category System (43, 1). Many of these instruments included categories intended to gather objective data on the frequency and type of teachers' questioning behaviors.

Third, the research of Bloom and Guilford gave impetus to major efforts to identify and classify components of the cognitive operation in the classroom. Despite the different intentions of these researchers—devising categories of objectives and intellectual operations, respectively—their models served to stimulate valuable research into the cognitive aspects of classroom interaction, particularly the questioning behaviors of teachers (6, 58). Sanders, and Gallagher and Aschner successfully adapted the categories of Bloom and Guilford, respectively, to produce systematic approaches that effectively identified the cognitive levels of teacher questions in the classroom setting (107, 54).

In addition to describing the kinds of questions teachers asked in the classroom during the 1950s and 1960s, researchers devised and implemented training programs to develop pre-service and in-service teachers' questioning skills. These training programs primarily focused on raising the level of teachers' questions to conform to desired student thought levels and implementing a variety of questioning techniques. The thrust of research was to evaluate the effectiveness of these training programs in terms of changing teacher behaviors (121).

Current Research Trends

The focus of research starting in the late 1960s has been on identifying teacher competencies, or those skills, practices, and behaviors that teachers

engage in that demonstrably contribute to gains in student achievement. This research is labeled "process-product" because investigations center on the instructional conditions (processes) that contribute to learning outcomes, including student achievement (products). Determining the impact of teacher questions on student learning outcomes, particularly those of a cognitive nature, continued to be a major emphasis of questioning research into the 1980s (132).

In all likelihood, several other trends that began in the 1970s and 1980s will continue through the 1990s as areas needing further research. Based on their review, Wilen and White concluded that more research is needed on the role of questions and questioning within the broader context of classroom interaction. Research needs to be conducted on how questioning techniques can be used in conjunction with alternative nonquestioning techniques, such as the use of statements, to stimulate student participation and thinking. Another needed area of research is how classroom leadership can be distributed more equitably in order to encourage students to assume more responsibility for classroom discussion. Another area of interest is the impact of questions and questioning on diverse student populations. Research also needs to be conducted on how teachers and students can acquire the skills appropriate for discussion-like interaction patterns (132). The most recent review of research on questioning suggests other related areas needing further investigation (113).

TEACHERS' QUESTIONING PRACTICES

The Purpose of Questions

One of the reasons why questioning has traditionally been considered the essence of effective teaching is because of the multiple purposes questions serve. Well over a century ago, Ross suggested two major purposes for questions: to ascertain whether students remember and understand what has been taught and to have students apply what they have learned (100). These two primary purposes clearly illustrate the major difference between current theory and practice about questioning. Theory strongly suggests that teachers should ask higher-cognitive-level questions to have students apply learnings and think critically while practice convincingly demonstrates that teachers ask low-cognitive-level questions to check recall of knowledge.

Although the two major enduring purposes of teacher questions are to determine student understanding of basic facts associated with specific content and to have students apply facts using critical thinking skills, educators have suggested other related purposes: (1) to stimulate student participation; (2) to conduct a review of materials previously read or studied; (3) to stimulate discussion of a topic, issue, or problem; (4) to involve students in creative thinking; (5) to diagnose student abilities; (6) to assess student progress; (7) to

determine the extent to which objectives have been achieved; (8) to arouse student interest; (9) to control student behavior; (10) to personalize subject matter; and (11) to support student contributions in class (11, 57, 69).

This variety of purposes strongly suggests the important role questions can play in instruction. It is not difficult to imagine a teacher using questioning behaviors related to a variety of purposes within a single lesson. A high school art teacher, for example, can arouse student interest and feeling by showing a slide of Salvador Dali's *Soft Construction with Boiled Beans, Premonition of Civil War* and asking, "What's your impression of this painting?" Higher-level divergent thinking can be stimulated further with, "What message might the artist be attempting to communicate in this work?" The teacher can then follow with a series of review questions focusing on the specifics of the Spanish Civil War, which the class has been studying as part of an interdisciplinary world history and art unit. Lower-level convergent thinking can be stimulated with these questions: "Who was the leader of the Nationalists who later became head of the Spanish government?" "Why did Germany and Italy get involved?" and "Where did most of the fighting take place?" Personalizing subject matter could be accomplished by asking "Lynn, how does the conflict between the Protestants and Catholics in Ireland affect the feelings of your pen pal in Belfast?" At any point, a question may be necessary to manage a student's off-task behavior by involving him/her in the learning activity ("Gregg, what are your thoughts on what Jim just said?"). Or a question can support a student's previous contribution ("What did Terri mention yesterday concerning her father's feelings about the Vietnam War?"). The teacher can close this discussion about one artist's representation of the horrors of war with a question designed to stimulate creative thinking: "What title would you give this piece?"

Although educators advocate using questions for a variety of purposes, what purposes do teachers see for questions? Pate and Bremer administered a questionnaire to 190 elementary teachers asking for the three most important purposes of teacher questions. Eighty-six percent of the teachers stated the purpose was to "check on effectiveness of teaching by checking on pupils' learning"; 54 percent said "diagnosis"; 47 percent said "check on pupils' recall of specific facts"; and only 10 percent said "require pupils to use facts in generalizing and in making inferences" (92, p. 418). Teachers clearly do not consider a major purpose of their questions to be stimulation of students' higher-level thinking.

Questioning Techniques

For more than 100 years much advice has been offered concerning questioning techniques for teachers to use during recitations and discussions. The advice has generally remained the same. In his 100-year review of British methods texts, McNamara found that information about questions has

remained consistent. Among the reasons he proposed are teachers' questioning skills are "common sense" and, therefore, endure; and methods texts, not often updated, tend to be redundant (88). Good and Brophy caution, however, that much of the advice on effective questioning techniques is based more on conventional wisdom than on research (56). This suggests researchers' uncertainty about the most effective techniques. Ladas and Osti realistically conclude, though, that teachers cannot wait until the research findings validate specific techniques; they need the best advice available now (83).

Table 1 contains a list of questioning techniques synthesized from a variety of works dealing exclusively or in part with questioning (11, 21, 56, 57, 66, 107, 130). Suggestions for implementation are included.

Table 1
QUESTIONING TECHNIQUES

1. *Plan key questions to provide lesson structure and direction.* Write them into lesson plans, at least one for each objective—especially higher-level questions necessary to guide discussions. Ask spontaneous questions based on student responses.
2. *Phrase questions clearly and specifically.* Avoid vague or ambiguous questions such as "What did we learn yesterday?" or "What about the heroine of the story?" Ask single questions; avoid run-on questions that lead to student confusion and frustration. Clarity increases the probability of accurate responses.
3. *Adapt questions to student ability level.* This enhances understanding and reduces anxiety. For heterogeneous classes, phrase questions in natural, simple language, adjusting vocabulary and sentence structure to students' language and conceptual levels.
4. *Ask questions logically and sequentially.* Avoid random questions lacking clear focus and intent. Consider students' intellectual ability, prior understanding of content, topic, and lesson objective(s). Asking questions in a planned sequence will enhance student thinking and learning particularly during discussions.
5. *Ask questions at a variety of levels.* Use knowledge-level questions to determine basic understandings and diagnose potential for higher-level thinking. Higher-level questions provide students opportunities to use knowledge and engage in critical and creative thinking.
6. *Follow up student responses.* Develop a response repertoire that encourages students to clarify initial responses, expand their responses, lift thought to higher levels, and support a point of view or opinion. For example, "How would you clarify that further?" "What are some alternatives?" "How can you defend your position?"
7. *Give students time to think when responding.* Increase wait time after asking a question to three to five seconds to increase the frequency and duration of student responses and to encourage higher-level thinking. Insisting upon instantaneous responses, particularly during discussions, significantly decreases probability of meaningful interaction with and among students.
8. *Use questions that encourage wide student participation.* Distribute questions to involve the majority of students in learning activities. For example, call on nonvolunteers using discretion regarding the difficulty level of questions. Be alert for reticent students' verbal and nonverbal cues such as perplexed looks or partially raised hands. Encourage student-to-student interaction. Use circular or semicircular seating to create an environment conducive to participation, particularly during discussions.

9. *Encourage student questions.* This promotes active participation. Student questions at higher-cognitive levels stimulate higher levels of thought, essential for inquiry. Give students opportunities to formulate questions and carry out followup investigations of interest.

Nonquestioning Techniques

During the past decade a small, but growing, body of research has suggested that the use of alternative, nonquestioning techniques may be more conducive than questioning techniques to stimulate student participation and thinking. In a study of 26 parochial junior and high school social studies and religion discussions, Dillon found that students responded as much to teacher statements as to their questions (28). In a followup analysis of five of these discussions, Dillon concluded that nonquestioning alternatives, including the use of statements and wait time, resulted in more student participation and talking, more student-student interaction and more student questions (32). Wood and Wood also found that teacher statements resulted in longer student responses and greater student initiative than did teacher questions (136).

Questioning Strategies

According to Hyman, a strategy is a "carefully prepared plan involving a sequence of steps designed to achieve a given goal" (69, p. xiii). It serves as a guide for the teacher to determine which questions to plan and ask in the classroom and it provides a framework for interaction with students. Without a strategy, a discussion can become a series of single questions lacking cohesion and purposeful sequence. Although the teacher must remain flexible and ready to respond to unpredictable interaction sequences, Hyman suggests that teacher effectiveness as a strategic questioner is based on the ability to manage the interaction by combining the individual questions into a pattern designed to achieve an objective.

In several publications Hyman outlines general and specific questioning strategies designed to achieve a wide range of subject matter goals (69, 70, 71). His most recent publication with Whitford on the discussion method provides illustrations of academic subject area topics for debriefing, problem solving, explanation, predicting, and policy discussions (72). The following is the questioning strategy Hyman proposes for a problem-solving discussion. It includes the questions a teacher might ask and the intended response behaviors on the part of the student.

Questioner:

1. What precisely is the problem confronting us? (*Respondent:* Describes the problem.)
2. What, in your opinion, are the chief causes of the problem? (*Respondent:* Identifies events and conditions leading to the problem.)

3. What are the relevant facts of the problem that are connected with the causes identified? (*Respondent:* Relates the problem to the causes, thereby interpreting the problem under consideration.)
4. What action do you recommend to solve the problem? (*Respondent:* Suggests a solution.)
5. What support do you have that your recommended action will solve the problem? (*Respondent:* Justifies the recommendation.)
6. If we took that action, what else might occur? (*Respondent:* Predicts other probable consequences.)
7. Based on the various points raised, what do you conclude is the best or appropriate way to solve the problem? (*Respondent:* Draws conclusion among alternative solutions proposed.)*

OBSERVING AND ANALYZING QUESTIONS

Classification Systems

Teacher and student questioning behavior can be specifically identified through the use of systematic observation instruments. These instruments aid in the observation and collection of objective data on such aspects of questions as cognitive level, length, and frequency. They can also record the sequence of the use of questions and questioning techniques. Some can identify verbalizations preceding and following questions as well as many characteristics of student responses (110). One review of research identified 21 classification systems for classroom questions (96). Most focused on identifying the cognitive levels of questions.

Although questions were formally classified according to cognitive levels as early as 1860 (100), not until the Stevens study in 1912 were they categorized for research purposes. This study classified questions recorded by stenographers according to those stimulating memory and reflection, with particular emphasis on those eliciting comparisons and judgments from students (111). Not until the middle 1950s through the efforts of Bloom and Guilford, were researchers provided explicit criteria for identifying and analyzing classroom thinking operations. The purpose of Bloom's research was to develop a classification scheme of educational objectives in the cognitive domain. He identified six major hierarchical classes of objectives ranging from simple to complex intellectual operations: knowledge, comprehension, application,

*Reprinted by permission of the publisher from Hyman, Ronald T. *Improving Discussion Leadership* (New York: Teachers College Press, © 1980 by Teachers College, Columbia University. All rights reserved), p. 45.

analysis, synthesis, and evaluation (6). Sanders adapted Bloom's classification to his study of questions by dividing the comprehension category into translation and interpretation because of the distinct kinds of thinking involved, and retitling the knowledge category "memory" (107).

During the period that Bloom devised his Taxonomy, Guilford developed his Structure of Intellect model, classifying intellectual factors several ways. One basis of classification is by the mental operations performed broken down into five major groups: cognition, memory, convergent thinking, divergent thinking, and evaluation (58). Based on Guilford's model, Gallagher and Aschner constructed a category system to examine teacher-student classroom interaction. Their major adaptation was to combine the cognition and memory categories because of the similarity of mental operations required (54).

Wilen developed a more simplified question classification system based on Gallagher and Aschner's conceptualization, and Enokson's interpretation, that also takes into account Bloom's categories. The levels are initially divided into convergent and divergent, corresponding to a hierarchy of intended narrow and broad student thinking, and then each is subdivided into low and high levels. The purpose of convergent questions is to determine basic knowledge, skills, and understandings in order to prepare students to apply learnings. Divergent questions require students to engage in critical thinking as they process information (75, 38). The Gallagher-Aschner/Bloom hybrid system follows.

> *Level I—Low Order Convergent:* questions requiring students to engage in reproductive thinking. The teacher's intention is to have students recall or recognize information. Because emphasis is on memorization and observation, students' responses can easily be anticipated ...
>
> *Level II—High Order Convergent:* questions requiring students to engage in the first levels of productive thinking. The teacher's intention is to have students go beyond recall and demonstrate understanding of information organizing material mentally. Although more thinking is involved at this level, student responses still generally can be anticipated ...
>
> *Level III—Low Order Divergent:* questions requiring students to think critically about information. The teacher's intention is to have students analyze information to discover reasons or causes, draw conclusions or generalizations, or to support opinions. Because higher-level productive thinking is involved, students' responses may not be anticipated ...
>
> *Level IV—High Order Divergent:* higher-order questions requiring students to perform original and evaluative thinking. The teacher's intention is to have students make predictions, solve lifelike problems, produce original communications, and judge ideas, information, actions, and aesthetic expressions based on internal or external criteria. Because

this level represents the highest level of productive thinking, students' responses generally cannot be anticipated (75, pp. 113-14; 122, pp. 4-6).

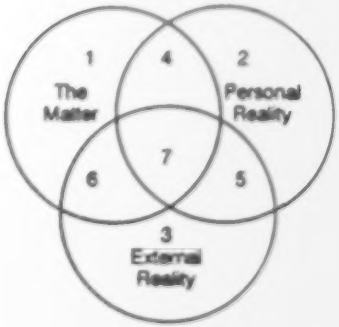
Knowledge and skill in classifying questions can help teachers determine the degree of student thinking being stimulated. This identification and subsequent analysis can ultimately help them ascertain if course goals and lesson objectives are being met.

Behavioral descriptors are provided for each category of the hybrid system in an observation instrument (see Figure 2, p. 30).

Table 2 (pp. 16-17) contains sample questions teachers might ask in their classrooms, categorized according to the Sanders, Gallagher-Aschner, and hybrid systems.

One other system deserves special attention because of its uniqueness in classifying questions, and its potential to stimulate critical thinking and personalize subject matter content. The systems previously presented assume a sequential and hierarchical thinking pattern. Christenbury and Kelly depicted different areas of questioning in the form of overlapping circles (see Figure 1). Although the circles represent different domains of cognition, they overlap and are not hierarchical; they suggest a high degree of flexibility in devising questions. Each circle represents a different aspect of reality: (1) *The Matter*—the subject of discussion (e.g., issue, problem, topic); (2) *Personal Reality*—the student's relationship with the subject; and (3) *External Reality*—the broader, more worldly perspective of the subject. The most

Figure 1
Questioning Circle



SOURCE: *Questioning: A Path to Critical Thinking*, by L. Christenbury and P. Kelly (Urbana, Ill.: ERIC Clearinghouse on Reading and Communication Skills and the National Council of Teachers of English, 1983). Funded by the National Institute of Education, U.S. Department of Education.

significant questions are higher-order; they are developed from the several circle intersections. An important contribution of this approach is the planned interaction of students' ideas, experiences, and values with the subject matter (12). Following are sample questions representing the circles and their interactions from one incident in *Huckleberry Finn*:

1. *The Matter*—What does Huck say when he decides not to turn Jim in to the authorities?
2. *Personal Reality*—When would you support a friend when everyone else thought he or she was wrong?
3. *External Reality*—What was the responsibility of persons finding runaway slaves?
4. *The Matter/Personal Reality*—In what situations might someone be less than willing to take the consequences of his or her actions?
5. *Personal Reality/External Reality*—Given the social and political circumstances, to what extent would you have done as Huck did?
6. *The Matter/External Reality*—What were the issues during that time which caused both Huck's and Jim's actions to be viewed as wrong?
7. *The Matter/Personal Reality/External Reality*—When is it right to go against the social and/or political structures of the time as Huck did when he refused to turn Jim in to the authorities?*

As an extension of the conceptualization of the questioning circle, Hunkins explained and demonstrated how this approach can be effectively used to encourage students to raise and process questions in the classroom (67, 68).

Teacher Questions and Student Thinking

Although a wide range of questioning is possible and recommended, research has consistently demonstrated that teachers ask low-cognitive-level questions typically requiring knowledge- or memory-level thinking. The finding of teachers' use of low-level questions has been verified at all school levels in a variety of subject areas. A sampling of studies follows. In his study of sixth grade history classes, Haynes reported that 77 percent of the teachers' questions solicited factual information while only 17 percent could be classified as requiring students to think (61). Classifying the verbal questioning behavior of 40 elementary teachers, Floyd found these teachers asking 93 percent of all classroom questions. Forty-two percent of the questions were on the memory level; only 6 percent stimulated higher-level thinking (44). Observing 14 science lessons in five elementary schools, Moyer

*From *Questioning: A Path to Critical Thinking*, by L. Christenbury and P. Kelly (Urbana, Ill.: ERIC Clearinghouse on Reading and Communication Skills and the National Council of Teachers of English, 1983), p. 16. Funded by the National Institute of Education, U.S. Department of Education.

Table 2

SAMPLE QUESTIONS CATEGORIZED ACCORDING TO SEVERAL SYSTEMATIC OBSERVATION SYSTEMS

QUESTION:	SYSTEM		
	Sanders (1966)	Gallagher-Aschner (1963)	Hybrid (1988)
Who invented the sewing machine?	Memory	Cognitive-Memory	Low-Convergent
What is the definition for photosynthesis?	Memory	Cognitive-Memory	Low-Convergent
What artists would be considered cubists? (based on students' reading)	Memory	Cognitive-Memory	Low-Convergent
In your own words, according to the story, how did the dog get loose?	Translation	Convergent	High-Covergent
How would you say this in German?	Translation	Convergent	High-Convergent
What is the meaning of this political cartoon?	Translation	Convergent	High-Convergent
How would you compare the climates of Miami and San Francisco?	Interpretation	Convergent	High-Convergent
How are these three members related?	Interpretation	Convergent	High-Convergent
According to our definition of revolution, which of the following conflicts would be considered revolutions?	Application	Convergent	High-Convergent
How would you solve this problem using the accounting procedure provided?	Application	Convergent	High-Convergent
What is an example of cooperation in your home?	Application	Convergent	High-Convergent
Why do you think the girl ran away from home?	Analysis	Convergent	Low-Divergent

Now that you have completed the experiment, what is your conclusion as to why the substance became denser?	Analysis	Convergent	Low-Divergent
What evidence can you provide to support your view that the constitutional power of the president has diminished over the years?	Analysis	Convergent	Low-Divergent
How can we raise money to support the recycling center?	Synthesis	Divergent	High-Divergent
Suppose that England had won the American War for Independence, how might pioneers' movement to the West have been affected?	Synthesis	Divergent	High-Divergent
What is a good title for this story?	Synthesis	Divergent	High-Divergent
Did you think the plot of this novel was well developed? Why?	Evaluation	Evaluation	High-Divergent
What is your favorite orchestral instrument? Why?	Evaluation	Evaluation	High-Divergent
How would you rate the effectiveness of the Environmental Protection Agency? Support your point of view.	Evaluation	Evaluation	High-Divergent

concluded that teachers are consistent in the types of questions they ask and are not encouraging critical thinking in their classes (90). This finding was supported by Blosser's review of observational studies of science classrooms: elementary and secondary science teachers operate primarily at the cognitive-memory level (7). Investigating the question levels of reading teachers in second-, fourth-, and sixth-grade classrooms, Guszak found the greatest portion on the recall and recognition levels with emphasis on literal comprehension (59).

At the secondary level, Gallagher studied 235 students in junior high and high school gifted classes, and concluded that the basis of classroom discourse was at the cognitive-memory level. The next most frequently used level was the convergent level (53). In a study of teacher-pupil interaction in junior-high English classes, Hudgins and Ahlbrand found students operating at the cognitive-memory level 80 percent of the time (65). Observing secondary school social studies student teachers, Davis and Tinsley found the emphasis on the memory level and more questions at this level than at all others combined. These researchers considered the conclusions distressing because of the assumed emphasis of critical thinking in the social studies (25). In his first review of research on questioning, Gall estimated that 60 percent of teachers' questions require memorization, 20 percent require students to think, and the remaining 20 percent are procedural. He reaffirmed this estimation in a later research review (46, 47).

The overall conclusion that many teachers have persisted in using low-cognitive-level questions applies also to written questions prepared for examinations and lesson plans, and those found in texts and other text-related materials. Pfeiffer and Davis categorized the questions contained in teacher-made semester examinations for all ninth grade courses at one junior high school, and then concluded, "The teacher-made examinations ... clearly emphasized the objective of knowledge acquisition and the mental process of memory" (93, p. 10). In another study, 67 pre-service teachers who had recently completed their student teaching experience, composed discussion and test questions for hypothetical eighth- and eleventh-grade American history classes. When the questions were categorized, the data revealed no differentiation in the questions planned for tests and discussions, or in those planned for junior and senior high school students. Moreover, more evaluation and memory questions were planned than all other types. Thus, the authors concluded that questions composed for secondary school students provided very little variety or opportunity to engage in critical thinking processes and skills (115). Randomly sampling the questions in fifth-grade social studies texts, Davis and Hunkins found that almost 90 percent of the questions emphasized recall of information (23). Trachtenberg found that over 95 percent of the questions analyzed from nine workbooks, tests, and teacher's manuals accompanying world history textbooks were lower order (117).

Congruency of Questions and Thinking

Ever since the first studies of teacher-student interaction were conducted, a major assumption has been that a direct and positive relationship exists between the cognitive levels of teacher questions and student thought levels. The research findings on this presumed relationship are mixed, however.

Taba's research project studied the developmental effects of a specially designed social studies curriculum and instructional program on student thinking skills. She found that teaching strategies that involved extensive questioning were the most important single influence on students' cognitive performance. Specifically, the research data clearly demonstrated that "the nature of the questions has a singular impact on the progression of thought in the class. The questions teachers ask set the limits within which students can operate and the expectations regarding the lack of cognitive operations" (114, p. 177). At about the same period, Gallagher and Aschner were attempting to identify and describe the kinds of thinking exhibited in the classroom. Using gifted students at the junior and senior high levels, they found the basis of classroom discourse to be cognitive-memory-level teacher questions and student responses. As for higher-level thinking, they found that a 5 percent increase in divergent-level questions initiated a 40 percent increase in divergent responses from students. Their conclusion: the teacher controls the thought levels in the classroom (53, 54). A study of student teachers in elementary science by Arnold, Atwood, and Rogers also found the question level significantly related to the response level (3).

The results of several other studies were inconsistent with these findings. Exposing students to three treatments of 65 percent higher-level teacher questions, 50 percent higher- and lower-level questions, and 65 percent lower-level questions, Konya found that students responded more often at higher levels when teachers asked equal amounts of higher- and lower-level questions (82). Mills and others reanalyzing the data from an earlier study (48) found only about a 50 percent relationship between teacher questions and student responses. They concluded, "The result provides a firm basis for dispelling the belief that there is a high correlation between types of teacher questions and types of student answers. It appears that training teachers to ask higher cognitive questions is not adequate in itself to insure comparable levels of student cognitive performance" (89, p. 200). Dillon, investigating secondary social studies and religion classes, found a similar lack of congruency between student responses and teacher questions (29).

In response to the finding that question and response levels are not highly related, Winne and Marx suggested that students' perceptions and teachers' intentions regarding the thinking required by higher cognitive questions may differ and this may lead to the lack of congruence (135). Mills and others recommended training teachers to incorporate verbal cues into their interaction to help students become aware of the thought processes required. Further, they

suggested training students in question classification to help them more easily play the higher cognitive questioning "game" (89). Klinzing, Klinzing-Eurich, and Tisher trained a group of 29 primary teachers in a West German school district in questioning techniques. They found significant increases in the proportion of higher-cognitive questions asked by the teachers and in the proportion of correspondence between the cognitive levels of teachers' questions and students' responses (79).

Wait Time

Essential to student thinking, especially at the higher cognitive levels, is the amount of time a teacher allots for student reflection after asking a question and before a student responds, and immediately after the student responds before the teacher or another student reacts. In her investigations, Rowe found the mean wait time to be one second after the teacher asked a question before the student responded. If the student did not respond in one second, the teacher either repeated or rephrased the question, asked another question, or called on another student. After receiving a response, the average teacher waited only 0.9 seconds before reacting or asking another question (102).

Rowe trained the teachers to increase their wait time to three to five seconds and found that the quantity and quality of students' responses improved dramatically. As a result of teacher training in wait time, among her conclusions Rowe found that the lengths of students' responses increased, responses reflected higher-level thought, failures to respond decreased, student-student interaction increased, and the frequency of student questions increased (102, 104). Rowe and Tobin completed comprehensive reviews of the research conducted on wait time over the past 20 years (103, 116).

THE IMPACT OF QUESTIONING ON LEARNING OUTCOMES

A major concern of teachers today is the impact their questioning behaviors have on student learning outcomes, particularly achievement. Of lesser concern, but also important, is the impact teachers' questioning has on student attitudes toward the subject. Only within the last 25 years have a growing number of studies provided some tentative conclusions.

Questions and Student Achievement

Research has demonstrated that teachers ask a high frequency of questions. For example, Schreiber found that fifth grade teachers asked an average of 64 questions each during 30-minute social studies lessons (109); Godbold found that elementary social studies teachers asked more questions than junior high

social studies teachers, and that, at the secondary level, experienced teachers asked more than inexperienced teachers (55). Based on their review of effective teaching research, Levin and Long concluded that teachers asked 300-400 questions per day (85). This compares with the mean frequency of 395 questions per day Stevens found in her very early study (111).

The frequency of teacher questions and student learning are positively related. In his first major review of correlational studies on teaching behaviors and student achievement, Rosenshine found that a high frequency of interaction related significantly to achievement (97). In a later study, in addition to finding that the frequency of factual single-answer questions was positively related to student achievement, Rosenshine found further support for the lack of relationship between the frequency of higher-level questions and achievement (99). Most of the studies he investigated focused on basic skill instruction in reading and mathematics for first through fifth graders. Good and Brophy offered several reasons for the relationship between the frequency of low-level questions and learning gains: (1) teachers who have high frequencies of questions plan and organize well, and therefore have few classroom management problems; (2) they heavily involve their students in academic activities leaving little time for them to pursue nonacademic goals; (3) they probably also involve their students in a variety of oral participation instructional approaches (56).

Research findings are inconclusive in determining if a relationship exists between the cognitive levels of the questions teachers ask and their students' gains in achievement. Buggey investigated the relationship between knowledge-level and higher-level social studies questions and achievement on tests in second grade classes and found that significantly greater achievement was made by students in the treatment group whose teachers asked 70 percent higher-level questions and 30 percent knowledge-level questions (9). In his replication of this study with fifth graders, Savage found no difference between the two questioning treatments. He concluded that at the fifth grade level, students' thought was not as dependent upon teacher questioning style as it was at the second grade level (108). Also using fifth graders in social studies, Kniep found that treatment groups of teachers using high level questions at least 70 percent of the time fostered students' ability to recall content and to respond to high-level questions (81). Ryan and Dunkin also found the higher level questions influenced the achievement of their fifth and sixth grade classes (105, 37). Armento, on the other hand, found that achievement was not a correlate of either high- or low-cognitive questions in her study of third through fifth grade teachers (2).

Mixed results have also been reported in subject areas other than social studies. Kleinman found that the students of seventh and eighth grade general science teachers who asked higher-level critical thinking questions performed better on a science achievement test than the students of teachers who asked questions requiring recall of information (76). Also using junior high science

teachers and students, but at the ninth grade level, Ladd found that teachers who asked a greater proportion of higher-inquiry questions, as compared to those who asked low-inquiry questions, caused greater change in student ach[illegible]ent as indicated on a post-test composed of low- and high-inquiry q[illegible] (84).

[illegible]al other studies are worthy of mention. Gall and others, using sixth grade classes, found that treatment group teachers asking 25 percent higher-cognitive questions outperformed two other groups using 50 percent and 75 percent higher-cognitive questions on knowledge acquisition and higher-cognitive written and oral tests. Discussions guided by 50 percent higher-cognitive questions were found to be the least effective in stimulating recall of information (52). Wilson examined the processing strategies of average and below-average sixth and seventh grade readers in response to factual and inferential questions. She found that average readers outperformed below-average readers in response to inferential questions but not in response to factual questions on the majority of reading passages (133). In the third study, Evenson found that treatments of 70 percent higher-cognitive-level questions facilitated fifth and sixth graders' recall of content but were ineffective in developing higher-level understandings (39).

Several major reviews of correlational and experimental studies have drawn contradictory conclusions regarding the effects of higher- and lower-cognitive-level questions on students' achievement. In his review of studies, Rosenshine found lower-cognitive questions more effective in promoting student achievement (98); Winne, reviewing 18 experimental studies, could find no differences between lower- and higher-order questions and their impact on student achievement (134); and Redfield and Rousseau, reviewing basically the same studies as Winne, reached the opposite conclusion that teachers' use of higher-level questions led to greater student achievement (95). Most recently, Samson and others, in their review of 14 studies, concluded there was little support for higher-level questioning enhancing student achievement (106).

Among the reasons that Gall and Rhody suggested for the conflicting findings was that researchers used different definitions of higher-cognitive questions and different question classification systems. As one of the conclusions of their review of the research, they recommended that teachers should use both lower- and higher-cognitive questions—lower-level questions to review basic facts and skills and higher-level questions to develop critical thinking ability and skills. They concluded, "It is difficult to imagine how students will learn to think unless they have repeated opportunities to respond to higher-level questions" (50, p. 42).

Very few studies have compared the effects of written and oral teacher questions. In a study involving 179 high school students, Rothkopf found better instructional results obtained from students who were questioned by teachers during individual study time compared to those who responded to

written questions from a science text (101). In his review of the literature, Hargie concluded that teachers' oral questions are more effective than written questions (60). Gall and Rhody suggested that oral questioning may be more effective because "... *listening* to teachers' questions and answering by *speaking* are easier for many students than *reading* textbook questions and *writing* answers to them" (50, p. 25).

Questioning Techniques and Achievement

Research has also demonstrated that teachers' use of a variety of questioning techniques also influences student achievement. Wilen and Clegg reviewed several syntheses of the process-product research literature to determine the types of questions and questioning techniques that correlated positively with student achievement gains (129). They concluded that effective teachers, or those who demonstrably contribute to their students' test score gains, engage in the following questioning practices:

1. phrase questions clearly;
2. ask questions of primarily an academic nature;
3. ask low-cognitive-level questions (and particularly high frequencies of low-cognitive-level questions with students of low socioeconomic status) in elementary settings;
4. ask high-cognitive-level questions, particularly in intermediate through high school settings;
5. permit student call-outs in low-socioeconomic-status classes while suppressing call-outs in high-socioeconomic-status classes, primarily in elementary settings;
6. allow three to five seconds of wait time after asking a question before requesting a student's response, particularly when high-cognitive-level questions are asked;
7. encourage students to respond in some way to each question asked;
8. balance responses from volunteering and nonvolunteering students;
9. elicit a high percentage of correct responses from students and assist with incorrect responses;
10. probe students' responses to have them clarify ideas, support a point of view, or extend their thinking;
11. acknowledge correct responses from students and use praise specifically and discriminately. (129, pp. 153-61).

These questioning techniques were illustrated with examples from classroom practice and further analyzed by Wilen (123).

Student Attitudes

The learning outcome receiving the least attention by researchers of teacher

questioning behavior is student attitudes. Several studies have investigated the influence of the discussion method on student attitudes toward the topics being discussed, types of questions asked, and other variables. Fisher found that discussion following reading significantly increased fifth grade student attitude change toward the study topic of American Indians over reading itself (42). Gall and others also found that discussion promoted positive sixth grade student attitudes toward the topic of ecology and the method of discussion in general. They did not find, though, that the variation of higher level questions within the discussions affected student attitudes (51). In another study, Mahlios and D'Angelo found that different question types did not affect students' attitudes toward the teacher or lessons that were based on the topic of industrialism (86). Considering preference as an indicator of attitude, Wilen investigated student preferences for the cognitive levels of their teachers' verbal questioning behavior and the relationship of preferences to test score gains. Students failed to indicate a preference for higher-level questions, and those who preferred low-level questions performed best on written tests incorporating such questions. Wilen concluded that students must develop positive attitudes toward higher-level questioning if instructional approaches such as inquiry are to be effective (131).

THE ROLE OF QUESTIONING IN CLASSROOM INTERACTION

Two forms of oral discourse in elementary and secondary classrooms are recitation and discussion. The technique most often used to encourage and facilitate student participation within these forms of interaction is teacher questioning (132).

Recitation

The most predominant form of oral discourse in classrooms is recitation, which is characterized by its familiar teacher initiation-student response-teacher feedback interaction pattern (62). Bellack and others found this pattern evident in the 60 social studies lessons taught to tenth-to-twelfth graders by 15 teachers in an urban center they investigated over a three-year period. Teachers dominate this cycle of interaction with their questions; within it, students' primary responsibility is to respond with answers. The teacher usually concludes the cycle with some form of acknowledgment or praise (5). Research has consistently verified this prevalent and persistent interaction pattern (112).

In their review of research on interaction and discourse in social studies classrooms, Wilen and White concluded that the recitation pattern persists in classrooms because of the continuous need to reaffirm the teacher's authority.

The teacher question-student response pattern helps manage the flow of talk with approximately 30 students, many of whom are reluctant volunteers. Another reason for the prevalence of recitation is that it allows the teacher to hold most of the speaking rights. Finally, teachers can also control interaction by reacting to what students say, rating it positively or negatively. In many respects, teacher talk is the language of control (132). Farrar also concluded that recitation is prevalent because teachers, in addition to finding it an efficient way to diagnose students' understanding of content, use it to control the topic through questioning and to control students' behavior through the question-answer format (41).

Three general purposes for conducting social studies recitations were identified in a two-year study of elementary teachers. Introducing new ideas accounted for 56 percent of recitations, review accounted for 21 percent, and checking understanding or clarifying (which occurred after reviewing or introducing material) accounted for 14 percent (112). In their review of research, Weil and Murphy concluded that "for learning factual material, this interaction strategy may be the most effective method available" (118, p. 911).

In their review of the research on recitation, Wilen and White found that a primary disadvantage of teachers' constant use of low-cognitive-level questions, for which students already know the answers, is that such questions provide little opportunity for students to use language to think and express their thoughts and ideas. These researchers also found that recitation-type interactions are used more frequently in low-socioeconomic-status classrooms and in classrooms where teachers perceive their students as low achievers. Ethnographic research also has shown that culturally different students have more difficulty in responding within the teacher initiation-student response-teacher feedback interaction pattern. Wilen and White concluded that while social studies teachers primarily rely on the recitation pattern, a greater variety of discourse strategies that are more conversational and discussion-oriented in nature are more appropriate to achieve citizenship education-related objectives (132).

Discussion

Discussion, the second major form of oral discourse, is practiced infrequently in elementary and secondary classrooms. Dillon found that many researchers labeled any teacher-student interaction, including recitation, as discussion (31). Wilen defined discussion as an educative, reflective, and structured group conversation with students. A key word is "conversation," which, in the context of the classroom, is an informal exchange of higher level thoughts and feelings. Although recitations are highly structured and educative, they are not higher-cognitive-level conversations (126).

The interaction pattern of a discussion is more varied than that of a recitation, with much more interaction between students. Less teacher talk and

more student talk occurs. The pace slows with both teacher and student utterances becoming longer. Teacher and students ask more open questions at the higher-cognitive levels with answers that generally are not predictable (126, 132).

The role of questions and questioning during discussions is not as essential as their use during recitations. The teacher asks fewer questions, relying on such questioning techniques as wait time and probing to encourage student thinking. Nonquestioning techniques assume a more important role since there is a tendency for them to enhance student participation (27, 30). Dillon advocates substituting multiple alternatives to teacher questions:

1. statements—the teacher should state the thought that occurs to him or her in relation to what the student has just said;
2. student questions—the teacher encourages a student to ask a question related to what the speaker has just said;
3. signals—the teacher signals his or her receptivity to what the student is saying, without taking the floor;
4. silences—the teacher says nothing at all but maintains a deliberate, appreciative silence for three or more seconds (33, 34).

Several reviews of the literature and research have produced findings that enhance our understanding of the potential of applying the discussion method in the classroom. Gall and Gall concluded that the discussion method is effective in achieving five types of student learning outcomes: (1) subject-matter mastery, (2) problem solving, (3) moral development, (4) attitude change and development, and (5) communication skills (45, 49, 50). Based on his review of the literature, Bridges characterized successful discussion as based more on student behaviors and less on teacher behaviors; he presented minimal conditions for genuine classroom discussion (8). Kindsvatter found that two sources of power, expert and referent, are readily available to the teacher and are especially associated with effective classroom discussion (73). In her analysis of anthropological research on classroom interaction involving minority students, White found that teachers can employ a variety of strategies to engage culturally different students in successful discussions (120).

As part of an extensive multidisciplinary research study on discussion and questioning directed by Dillon, investigators discovered, among many of the findings, that most of the teachers excessively controlled classroom interaction (35). Klinzing and Klinzing-Eurich concluded that teachers could have encouraged more student involvement by asking a few key questions, instead of frequent questions, and avoiding reaction to every student response. Teachers should keep the discussion from moving back to the teacher so as to reduce control (78). Wood and Wood concluded that teachers can control discussions through their use of questioning by stifling student initiative. They found student initiative low during recitations and higher during discussions. The teacher's goal during discussion should be to increase student initiative

and loquacity; control through questioning inhibits these characteristics (136). In a review of this research study, Wilen recommended that teachers (and students) need to learn more about conducting discussions. Training in a variety of questioning and nonquestioning techniques is essential to conducting effective discussions (125). Further reporting of the theory, research and practice of the discussion method can be found in Wilen (127).

IMPROVING QUESTIONING PRACTICES

Once the importance of teacher questions as a stimulus to student participation, thinking, and learning was realized, the development of instructional improvement programs to acquaint and train pre-service and in-service teachers in questioning skills was inevitable. Researchers, teacher educators, and some commercial producers devised instructional improvement programs during the 1960s and 1970s to train teachers to raise the cognitive emphasis of their questions and to use a wide range of questioning techniques.

Research has demonstrated that a variety of instructional improvement techniques can be effectively applied in training pre-service and in-service teachers to improve their questioning skills. In his analysis of several reviews of research on teacher education training practices, Wilen found that the most effective programs incorporate the following practices: observation of teaching (both live and simulated), instructor demonstration of skills, practice of skills in simulated and live classroom settings, and provision of feedback about performance. He suggested that a variety of instructional improvement techniques illustrative of these practices are appropriate for developing teachers' questioning skills. These techniques include peer observation, systematic observation instruments, instructor modeling, microteaching, minicourses, and coaching (124). The practices of demonstration, skill development, observation, and feedback were the basis of an in-service program designed to improve teachers' questions and questioning skills in a major Canadian school system (128).

Research has demonstrated that teachers can be effectively trained to raise the cognitive emphasis of their questions. Teacher educators can devise training programs relatively easily that incorporate increasingly complex skill development activities (121). Although Houston conducted one of the first successful in-service training programs over 50 years ago (64), not until the 1960s was a wide range of effective training programs developed and tested. Using Bloom's Taxonomy to introduce the cognitive levels, Clegg and others found that in-service and student teachers significantly altered their questioning behaviors by achieving higher cognitive levels in the classroom (14, 40). Also using Bloom's taxonomy in an individualized in-service approach, Zoch found that his experimental group of kindergarten and first grade teachers asked a greater percentage of higher-level questions (138).

Using videotaped lessons as the means of instruction with Gallagher and Aschner's classification scheme, Cunningham found that pre-service elementary science teachers significantly decreased the proportion of cognitive-memory-level questions and significantly increased the proportion of divergent-level questions after instruction (20). After an in-service program on questioning skills, Psencik found American history teachers asking more above-memory-level questions (94). Crump developed and used learning packages to successfully alter intermediate social studies teachers' oral and written questioning behaviors (18). Wright found a microteaching program the most effective technique for secondary methods students to increase questioning levels (137). Not all training programs have been successful, however. Douce and Welch did not find that their training approaches resulted in teachers asking more higher-cognitive-level questions (36, 119).

The Far West Laboratory for Educational Research and Development has produced and successfully tested a program to assist teachers in developing questioning skills. This minicourse is a self-contained in-service training program that uses, in part, microteaching. Several versions have been produced and found effective (46). Using the minicourse approach, Pagliaro found that student teachers increased the frequency of their questioning behaviors when placed with cooperating teachers who used high frequencies of questioning behaviors (91). Buttery and Michalak also used the minicourse approach to train elementary-level student teachers. Using a clinical supervision process, they found the experimental group significantly improved in 11 questioning skill areas, as compared with a control group that improved in only two areas (10). In another study, Malvern found that students of in-service teachers with training in the minicourse approach improved their inferential thinking skills over students of teachers without such training (87).

The minicourse has been more recently translated and adapted for elementary and secondary pre-service and in-service training in West Germany. Researchers have used it to increase the cognitive level of teachers' questions and the percentage of student talk including questions (80), and to increase the congruence between the cognitive levels of teachers' questions and students' responses (79).

Realizing that a systematic approach to improving instruction can be threatening when conducted by those outside the classroom, and that it can also be time-consuming and costly, Kindsvatter and Wilen developed a practical and effective approach for teachers to use. Improving Classroom Instruction (ICI) focuses on a variety of instructional skill areas, including the cognitive levels and techniques of questioning. Teachers can use it as either a shared-analysis approach with a colleague, or as a self-analysis approach in conjunction with a video or audiotape recording. The self-analysis approach is a particularly nonthreatening and convenient way for teachers to gather objective and subjective information about their questioning behaviors as displayed in the classroom setting.

The following steps are recommended for applying the ICI self-analysis approach:

1. Become familiar with the four cognitive levels of questions and question-asking techniques.
2. Teach a class, or portion of a class session, using questioning behaviors with an audio or videotape being made.
3. Identify and analyze questioning behaviors by completing the analysis forms (see Figures 2 and 3 on the following pages) while viewing (and/or listening) to the taped playback.
4. Assess performance and repeat steps 2 and 3 if further improvement is needed (74).

A unique feature and advantage of the ICI approach is the two-dimensional analysis feature of the questioning skills form (Figure 3). Incorporated on the form are two columns: "Occurrence," for recording the extent each questioning technique is evident, and "Effectiveness," for estimating the level of the teacher's use of each technique. These two kinds of data—descriptive and evaluative—contribute to a more comprehensive analysis (75).

Based on their extensive review of the research, Klinzing and Floden recently proposed that teachers can engage in self-improvement programs using the inquiry process as the basis for experimenting and developing their skills to conduct discussions. They suggest that certain knowledge and skills are needed to conduct experimentation while teaching: background knowledge, an ability to use concepts to guide analysis and consequent action, a capacity for generating hypotheses, and an ability to carry out skillfully the actions suggested by the hypotheses and to learn from the results. They further suggest that groups of teachers working together experimenting with discussion increase the probability for improvement (77).

Another practical and beneficial method teachers can use to gather information on their questioning behaviors is to have their students act as observers and data gatherers. Hogg and Wilen suggest that students can be a practical and reliable source of feedback on teacher performance because they observe the teacher in action many hours each week. As observers, students provide a large sample, thereby reducing individual biases and increasing reliability. Systematic student observation of teachers is inexpensive, requires little time, and fits well into the classroom schedule. Secondary students can be easily trained to identify four levels of questions, while intermediate students can easily work with two levels. A data gathering form incorporating space for students to record verbatim questions and to categorize them is quite simple to construct (63). Hunkins suggests several techniques to involve students in identifying and analyzing teacher questions (66, 68).

Figure 2
ANALYSIS FORM: QUESTION LEVELS

TEACHER _____ **OBSERVER** _____

CLASS _____ **DATE** _____

COGNITIVE LEVELS—	Number of Questions Asked	Percentage of Total	Estimated % of Time Devoted to Each Level
LEVEL I—LOW ORDER CONVERGENT: Requires students to recall or recognize information. Emphasis on memorization and observation. Responses can easily be anticipated. Students define, recognize, quote, identify, recall, and answer "yes" or "no." Corresponds to Bloom's Knowledge Level.		%	%
LEVEL II—HIGH ORDER CONVERGENT: Requires student to demonstrate understanding and apply information. Students describe, compare, contrast, rephrase, summarize, explain, translate, interpret, relate, apply, use, provide an example, and solve. Corresponds to Bloom's Comprehension and Application Levels.		%	%
LEVEL III—LOW ORDER DIVERGENT: Requires student to critically think about information, ideas, and opinions. Students discover motives, reasons or causes; draw conclusions, inferences or generalizations; provide evidence or support for conclusions, inferences or generalizations. Corresponds to Bloom's Analysis Level.		%	%
LEVEL IV—HIGH ORDER DIVERGENT: Requires students to perform original, creative, and evaluative thinking. Students produce original communications, make predictions, propose solutions, create, solve lifelike problems, speculate, construct, devise, write, design, hypothesize, synthesize, develop/judge ideas and problem solutions, express opinions, and make choices and decisions. Corresponds to Bloom's Synthesis and Evaluation Levels.		%	%
TOTALS		%	%

SOURCE: *Dynamics of Effective Teaching*, by R. Kindsvatter, W. Wilen, and M. Ishler, pp. 139-40. Copyright © 1988 by Longman, Inc. Reprinted with permission.

Figure 3
ANALYSIS FORM: QUESTIONING TECHNIQUES

TEACHER _____

OBSERVER _____

CLASS _____

DATE _____

ANALYSIS SCALES

OCCURRENCE	EFFECTIVENESS
1. Not evident	1. Not effective
2. Slightly evident	2. Slightly effective
3. Moderately evident	3. Moderately effective
4. Quite evident	4. Quite effective
N Not applicable	N Not applicable

CATEGORIES (Parts A-B correspond to Occurrence and Effectiveness in the Analysis Scales)	A. OCCURRENCE	B. EFFECTIVENESS
1. PHRASING. A. Teacher uses questions. B. Teacher phrases questions so that response expectations are clearly communicated to students; no run-on questions.		
2. ADAPTING QUESTIONS: A. Teacher adapts questions to the class. B. Teacher adjusts questions to the language and ability level of the students.		
3. SEQUENCE: A. Teacher asks questions sequentially. B. Teacher asks questions in a patterned order indicating a purposeful questioning strategy.		
4. BALANCE: A. Teacher balances convergent and divergent questions. B. Teacher uses questions at appropriate levels to achieve the objectives of the lesson.		
5. PARTICIPATION: A. Teacher uses questions to stimulate a wide range of student participation. B. Teacher encourages student involvement by balancing responses from volunteering and nonvolunteering students; redirects initially answered questions to other students; encourages student-student interaction particularly appropriate during a discussion.		
6. PROBING: A. Teacher probes initial student responses to questions particularly during discussions. B. Teacher follows up initial student responses with questions that encourage students to complete, clarify, expand, or support their responses.		
7. WAIT TIME: A. Teacher uses wait time after asking questions and after students' responses, particularly during discussions. B. Teacher pauses a minimum of 3 seconds after asking divergent questions in order to allow student thinking; teacher also pauses after students' initial responses to questions to encourage continued commentary.		
8. STUDENT QUESTIONS: A. Teacher has students formulate questions. B. Teacher encourages students to devise pertinent questions to stimulate thinking at the divergent level; students ask thoughtful questions.		

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CONCLUSIONS

The questions teachers regularly ask in class reflect the short- and long-range decisions they have made about how students learn, what should be taught, and how instruction should be implemented. In a very basic sense, the kinds of questions teachers ask and the techniques they employ to interact with students imply their philosophy of teaching. Most of the decisions teachers make about questioning in the classroom are intuitive and are therefore based primarily on experience. But effective teaching reflects informed decision making and informed decision making is rooted, in part, in knowing what theory and research have to offer. Realizing that research should inform practice, the intention of this monograph has been to provide a convenient reference for teachers so that they might be more aware of what research is saying to them about questions and questioning.

The following generalizations are derived from the research literature on questions and questioning and related areas:

1. Teachers can use questions to achieve a great variety of instructional and managerial purposes in the classroom.
2. The types of questions teachers ask in the classroom can be classified many different ways but the most dominant pattern has been to classify them by cognitive level.
3. Teachers have persisted in asking questions that primarily require students to recall basic information. Minimal emphasis has been placed on encouraging students to think about what they have memorized.
4. The use of primarily low-cognitive-level questions is also evident in textbooks, text-related materials, and examinations.
5. Higher-cognitive-level questions encourage students to think critically, particularly when students are pushed to clarify, explain, and support their responses.
6. There exists approximately only 50 percent congruence between the cognitive levels of teachers' questions and students' responses.
7. While there is a positive relationship between teachers' use of low-cognitive-level questions and gains in student achievement, the findings of studies on the relationship between higher-level questions and student achievement are mixed.
8. There is a relationship between the questioning techniques teachers employ and gains in student achievement. Support exists for clearly phrased questions, academic questions, probing, wait time, student call-outs, students' correct responses, calling on nonvolunteering students, and acknowledgement of student responses during recitations and discussions.
9. The influence of teachers' questioning behavior on students' attitudes toward discussion topics, for example, is not conclusive.

10. Recitation is the primary form of oral interactive discourse in classrooms, as evidenced by teacher use of the initiation-response-reaction pattern and a high frequency of knowledge-level questions. It persists primarily because of its inherent controlling nature over interaction and student behavior.
11. Recitation is very effective as an instructional method in teaching students to acquire factual information.
12. Students take little initiative during recitations and discussions and ask few questions. This may be due to the controlling influence the teacher maintains during interaction with students.
13. Discussion can be used to achieve many instructional goals. Its success as a method depends on the extent to which the teacher is willing to reduce control and encourage student initiative and involvement.
14. Discussion is used infrequently in classrooms. Teachers and students know little about questioning techniques appropriate for conducting discussions.
15. Employing nonquestion alternatives such as a variety of statement forms seems to encourage student participation, particularly during discussions.
16. Teachers can be trained to improve questioning practices by, for example, raising the cognitive emphasis of their questions and using a variety of questioning techniques.

These generalizations from research on questions and questioning demonstrate that a substantial and useful body of knowledge is being developed. While most scholars have expressed their conviction that enlightened questioning practices are essential for optimally effective teaching, others have expressed some reservations about the kinds of questions teachers ask and the techniques they employ. Questioning is not the simplistic, intuitively based practice that uninformed persons commonly assume; it is a complex and dynamic aspect of interpersonal communication. While we know much, this monograph makes it clear that more is to be learned through research and examined practice.

Committed teachers can enhance their questioning skills based on current knowledge about questioning. Important new knowledge will emerge from the continued interest and efforts of scholars and practitioners. The quest for the perfect questioning technique or strategy may never be fulfilled, but its pursuit is a worthwhile endeavor for every teacher.

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